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Pages including this cover page: 10

Application of: Keogh et al.
Serial Number: 10/054,447 Filing Date: January 22, 2002
For: Method for Coating Medical Device Surfaces

Dear Examiner Hagopian,

With regards to our interview scheduled for Wednesday, November 19, 2008, 11:00 AM EST, attached are the materials to be discussed in our interview.

1. Haynes 25 Wite - Ken-Tron (1 page)
2. Haynes 25 Alloy Information Report All Metals & Forge (2 pages)
3. Stellite - Wikipedia (2 pages)
4. ESPI Alloy Composition (1 page)
5. Elgiloy Speciality Metals Technical Data Sheets (2 pages)
6. Maraging Steels and Phynox (Elgiloy) (1 page)

Thank you. I look forward to our telephone interview.

James Ackley

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Chemical Composition

Co	Cr	W	Ni	Fe	Mn
51	21 max	15	10	<3	2 max

Temperature Coefficient Of Thermal Expansion

At	µ m/m per °C
25-100°C	12.3

Other Properties

Density (lbs/in^3)	.330
Melting Point (°F)	2570

	Annealed	Spring Temper
Tensile Strength	138-160 KSI	203-261 KSI

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Alloy Information Report for H

General Characteristics of Haynes™ 25

Haynes™ Alloy 25 offers outstanding room temperature ductility and excellent mechanical characteristics up to 1800°F (982°C) when fully annealed. This is a wrought, cobalt-base alloy that resists oxidation and carburization to 1900°F (1038° C).

Chemical Composition of Haynes™ 25

- Carbon 0.05-0.15
- Manganese 1.00-2.00
- Silicon 1.00 max
- Chromium 19.00-21.00
- Nickel 9.00-11.00
- Tungsten 14.00-16.00
- Iron 3.00 max
- Cobalt 46.00-53.00

Heat Treatment of Haynes™ 25

- Gas turbine rotors
- Parts to withstand high heat and stress

Applications of Haynes™ 25

- Springs up to 1000°F (538°C)
- High temperature parts

Machinability of Haynes™ 25

- High-speed tools at low speeds with shallow cuts
- 4-5° front and side relief, 8° side rake, 0-8° back rake, 15-30° side edge angle, 1/32-1/16" nose radius
- High speed drills with maximum pressure
- Cutting fluids required

Workability of Haynes™ 25

- Roll into sheets
- Forge or roll into bars
- Ideal for bending, drawing, stamping and spinning

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Stellite

From Wikipedia, the free encyclopedia

Stellite alloy is a range of cobalt-chromium alloys designed for wear resistance. It may also contain tungsten and a small but important amount of carbon. It is a trademarked name of the Deloro Stellite Company and was invented by Elwood Haynes[1] in the early 1900s as a substitute for flatware that stained (or that had to be constantly cleaned).

Contents

Properties

Stellite alloy is a completely non-magnetic and non-corrosive cobalt alloy. There are a number of Stellite alloys, with various compositions optimised for different uses. Information is available from the manufacturer, Deloro Stellite, outlining the composition of a number of Stellite alloys and their intended applications. The alloy currently most suited for cutting tools, for example, is Stellite 100, because this alloy is quite hard, maintains a good cutting edge even at high temperature, and resists hardening and annealing due to heat. Other alloys are formulated to maximize combinations of wear resistance, corrosion resistance, or ability to withstand extreme temperatures.

Stellite alloys display astounding hardness and toughness, and are also usually very resistant to corrosion. Stellite alloys are so hard that they are very difficult to machine, and anything made from them is, as a result, very expensive. Typically a Stellite part will be very precisely cast so that only minimal machining will be necessary. Machining of Stellite is more often done by grinding, rather than by cutting. Stellite alloys also tend to have extremely high melting points due to the cobalt and chromium content.

Applications

Typical applications include saw teeth, hardfacing, and acid-resistant machine parts. Stellite was a major improvement in the production of poppet valves and valve seats in internal combustion engines; by reducing wear in them, the competing slide-valve design was driven from the market. The first third of M60 machine gun barrels (starting from the chamber) are lined with Stellite. In the early 1980s, experiments were done in the United Kingdom to make artificial hip joints and other bone replacements out of precision-cast Stellite alloys.

Stellite has also been used in the manufacture of turning tools for lathes. With the introduction and improvements in tipped tools it is not used as often any more, but it was found to have superior cutting properties compared to the early carbon steel tools and even some high speed steel tools, especially

against difficult materials such as stainless steel. Care was needed in grinding the blanks and these were marked at one end to show the correct orientation, without which the cutting edge could chip prematurely.

While Stellite remains the material of choice for certain internal parts in industrial process valves (valve seat hardfacing), its use has been discouraged in nuclear power plants. In piping that can communicate with the reactor, tiny amounts of Stellite would be released into the process fluid and eventually enter the reactor. There the cobalt would be activated by the neutron flux in the reactor and become cobalt-60, a radioisotope with a five year half life that releases very energetic gamma rays. While not a hazard to the general public, about a third to a half of nuclear worker exposures could be traced to the use of Stellite and to trace amounts of cobalt in stainless steels. Replacements for Stellite have been developed by the industry, such as the Electric Power Research Institute's "NOREM", that provide acceptable performance without cobalt. Since the United States nuclear power industry has begun to replace the Stellite valve seat hardfacing in the late 1970s and to tighten specifications of cobalt in stainless steels, worker exposures due to cobalt-60 have dropped significantly.

Varieties

Talonite is an alloy similar to Stellite which has been hot-rolled and hardened in a particular way, to provide a combination of hardness, wear resistance and machinability. Not all Stellite alloys respond to this process.

Notes

1. ^ "The WPI International Corporate Leaders Roundtable: The Impact of Evolving Technologies on the Future of Business: Notable Achievements of Alumni of Worcester Polytechnic Institute" (http://www.wpi.edu/News/Conf/Roundtable/Barcelona/alumni.html). Elwood Haynes, Class of 1881.

External links

- Material Safety Data Sheet for stellite (http://www.armstrongblue.com/Publications/msds__stellite_tips.htm), includes table of compositions of individual variants
- Deloro Stellite company website (http://www.stellite.com/)

Retrieved from "http://en.wikipedia.org/wiki/Stellite"
Categories: Cobalt alloys

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Alloy Composition

Alloy: Elgiloy®

Nominal Composition in Percent:

Ni	15.50
Co	40.00
Cr	20.00
Mo	7.00
Fe	Balance
Mn	2.00
C	0.150
Be	0.0100

UNS Number: R30003

Other Standard Specifications: AMS 5833, AMS 5876, ASTM F1058, NOL-WS 13822

Density: 8.30 g/cm^3 (0.300 lbs/in^2)

Exceptional Properties: High strength, temperature resistance, corrosion resistance

Elgiloy Specialty Metals Technical Data Sheets

This page has links to all data sheets in MatWeb for the manufacturer Elgiloy Specialty Metals.
We have several search tools, listed above, that give you more efficient methods to reach the information that you need.

Elgiloy Specialty Metals has 30 material(s) in the MatWeb database.

Back to Manufacturer List

- Elgiloy® Co-Cr-Ni Alloy, Strip
- Elgiloy® Co-Cr-Ni Alloy, Strip, 10% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Strip, 10% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Strip, 20% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Strip, 20% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Strip, 30% Cold Reduction
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- Elgiloy® Co-Cr-Ni Alloy, Wire
- Elgiloy® Co-Cr-Ni Alloy, Wire, 10% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Wire, 10% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, 20% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Wire, 20% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, 30% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Wire, 30% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, 40% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Wire, 40% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, 47% Cold Reduction (Coil Spring Range)

- Elgiloy® Co-Cr-Ni Alloy, Wire, 47% Cold Reduction (Coil Spring Range), Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, 65% Cold Reduction
- Elgiloy® Co-Cr-Ni Alloy, Wire, 65% Cold Reduction, Heat Treated
- Elgiloy® Co-Cr-Ni Alloy, Wire, Heat Treated

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Maraging steels and Phynox (Elgiloy)
Other specialties
Metals and alloys for medical applications
All alloys

Maraging steels: Durnico (Durimphy, NiMark 300), Duri

Martensitic, hardenable premium steels in the form of thin strips are a ren different maraging steels are rolled: **Durnico**, X2NiCoMo18-9-5, 1.6358 (Duri 1.6908 (Ultrafort). A slightly higher mechanical strength can be achieved with D of Durnico, though is slightly lower than that of stainless steel 1.4435, 316L. very high fatigue strength, whilst critical cutting edges remain smooth. After s 850 to 1,000°C), they can be hardened for several hours at about 480 °(N/mm^2.The hardening process occurs through the presence of very stable whereas no deformation (distortion) of the treated parts occurs. Hardening c since the hardening temperature does not lead to re-crystallization, the materia

Phynox, UNS R30003, (Elgiloy) is an austenitic hardenable superalloy on col Its mechanical strength may exceed 2,600 N/mm^2, after the hardening. The m significantly on the preceding cold deformation. It is non-magnetic, very resista steel) and temperature resistant. Its high elasticity modulus (220 kN/mm^2) com N/mm^2 makes Phynox an exceptional alloy for spring application. Lamineries following standards: ASTM F1058 (surgical implants), ISO 5832-7 (surgical AMS 5875, AMS 5876 and NACE MR0175.

Maraging steels: Durnico (Durimphy), Durinox (Ultrafort) and Pl

Description

Durnico - Maraging Steel / ~ 1.6358 / ~ K93120 / ~ K93160 / ~ X2NiCoMo1
Durinox - Maraging Steel / 1.6908 / X2NiCrMoTi10-10-5
Phynox - Cobalt Superalloy R30003 / R30008